SUBSISTENCE WHALING IN ALASKA

by

ERIK van VEENEN

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Scott Polar Research Institute, Cambridge.

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I declare that this dissertation is between 10,000 and 20,000 words in length.

[redacted]

Erik van Veenen

Clare Hall,
Cambridge.

'It is a false dichotomy to think nature and man.

Mankind is that factor in nature which exhibits in its most intense form the plasticity of nature.'

Alfred North Whitehead

Frontispiece

Eskimo whaling flags at Barrow, 1976

Home designed flags are commonly used in marking the success of a whaling camp.

Table of Contents

List of Maps

Glossary

Ahvik, Eskimo word for a Bowhead whale (Baleaena mysticetus).

Baleen, Black whale bone from the mouths of toothless whale.

Bomb, or bomb lance, projectile fired from a shoulder gun or darting gun. A brass tube about fourteen inches long filled with black powder and fitted with a short delay fuse. It is brass pointed and "feathered" at the other end.

Darting gun, A gun carrying both a bomb and a harpoon. The whole apparatus is darted.

Flukes, The horizontal tail of a whale.

Hauligax, Eskimo word for harpooner

Ing-o-tok, Small Bowhead, under 12 metres long.

Iron, the name commonly applied by whalers to a harpoon.

Karia-lik, Eskimo word for a large Bowhead over 12 metres long.

Muktuk, Eskimo word for the skin of a whale with blubber attached.

Nulakataq, Eskimo word for the festival at the end of the whaling season, named after the walrus hide blanket used for the blanket toss during the festival.

Polynyas, large non-linear openings in the pack ice.

Shoulder gun, or bomb gun, A heavy brass, breech-loading shoulder gun which fires a bomb. Maximum range, 30 metres.

Skidoo, Commonly used by Eskimo; name for a snow machine (after the Canadian manufacturer's brand name).

Sound, to sound, Diving or submerging of a whale.

Umiak, Eskimo word for boat, large walrus- or seal-skin covered seagoing craft, up to 13 metres long.

Umialik, Eskimo word for boat owner, captain.

Usingwachak, Eskimo word for a very Large Bowhead, which has a different hump (spouthole) from other Bowheads. Distinguished as a different kind of whale.

Whalebone, baleen.

Yankee whaler, New England whalers.

Abstract

In a splendid geographic setting, the Eskimo of western and northwestern Alaska have for centuries risked the ice and elements in pursuit of one of the largest and most magnificent animals on earth, the Bowhead whale.

The life cycle of the Bowhead whale wholly depends on the pack ice, near the edge of which it lives throughout the year.

Commercial exploitation by Yankee whalers made heavy inroads on the Bowhead whale stocks of the north Pacific Ocean.

Half a century of commercial exploitation of the Bowhead whale by Yankee whalers not only made heavy inroads on the whale stocks, it also made a heavy imprint on the life of the neolithic Eskimo whalers. Modern technological aids drastically altered the pattern of post-white contact whaling by Eskimos. This pattern was allowed to stabilize to some extent after the collapse of the commercial whaling industry in 1908. After the second world war a new wave of white presence in the north again caused drastic social and economic changes to take place.

Earning opportunities on military and oil pipeline construction affected whaling traditions. Many inexperienced Eskimo men aspiring for the traditional social status of whaling captain, were with their high incomes able for the first time to outfit their own crews.

The century-old traditions in whaling eroded as a result, and some Eskimo whaling became merely a form of sport.

In 1977 the interference of powerful conservationist groups, alarmed by the increased number of animals wounded by inexperienced and unethical whalers brought about an International Whaling Commission ban on the taking of Bowhead whales.

WESTERN AND NORTHWESTERN ALASKA, THE SETTING

I Western Alaska

Saint Lawrence Island and the Bering Strait

From the vast expanse of the north Alaskan plain to the rugged undulating topography of the Seward peninsula and the ancient volcanic mountains of Saint Lawrence Island, the whaling communities of Alaska occupy a range of widely contrasting landscapes.

The villages of Barrow, Point Hope, Gambell, Wainwright, Kivalina and Wales, in order of magnitude, are the only locations in Alaska where subsistence whaling is regularly attempted on a seasonal basis (see Appendix I).

Other small western coastal villages where whaling is known to have been pursued within historical times are Little Diomede, Point Lay, King Island, and Savoonga.

Moving north along the migratory path of the Bowhead whale, from the wintering grounds at the southern limit of the Bering Sea pack ice, Saint Lawrence Island is the point of land first encountered (see Appendix I).

Saint Lawrence Island

Saint Lawrence Island with its maximum length of 152 kilometres and width of 40 kilometres is the largest island in the Bering Sea. It is situated 208 kilometres southwest of Nome (63°30'N, 170°30'W) on the Seward Peninsula, and only 67 kilometres east of the Siberian mainland.

More than 80 percent of the human population lives permanently in the villages of Gambell and Savoonga. The remainder of the

population is scattered over the island in temporary hunting, trapping and fishing camps.

The Aleutian low pressure area and its accompanying Pacific storm belt make the climate of the island miserable for human beings - cold, windy and humid, with freezing rain and snow occurring in any month of the year. Fog is especially common during the ice-free summer months, frequently inhibiting hunting activities. Saint Lawrence Island is enclosed by the Arctic pack ice for about eight months of the year, and the commercial navigation season is limited to the summer months.

Two-thirds of the island is composed of low-lying featureless tundra, dotted with hundreds of small lakes. The remainder of the island is composed of volcanic and crystalline uplands ranging up to 560 metres, with the highest peak, Mount Atule, at 660 metres.

Gambell, on Northwest Cape (63°47'N, 171°45'W) is the main hunting and fishing village on the island, as it occupies the best location for whaling and walrus hunting. The current population is approximately 600. A small permanent village has grown up around the United States military airbase at East Cape, and it owes its existence to the employment opportunities at that base.

Savoonga, on the north coast of the island (63°42'N, 170°29'W), 62 kilometres southeast of Gambell, is a recent village grown from a reindeer camp settled in 1930 by malcontents from Gambell. The current population is approximately 300.

Bering Strait

The Bering Strait region is physiographically the most

varying of all landscapes occupied by any whaling communities.

The granite talus slopes of Cape Prince of Wales (65°34'N, 168°00'W), the westernmost promontory of the North American continent, rise abruptly out of the sea to a height of 760 metres. To the east, the rugged York Mountains present a veritable lunar landscape of barren rocky hills, deeply incised by numerous canyons and gullies.

To the northeast of the Cape the landscape changes abruptly to a low-lying plain dotted with hundreds of small lakes.

A continuous line of low-lying barrier islands, with brackish to freshwater lagoons, make up the coastline between Cape Prince of Wales and Cape Espenberg, about 240 kilometres to the northeast.

The village of Wales is situated just to the north of Cape Prince of Wales. The current population is approximately 180, only a fraction of its known maximum of 800 in 1888. The local economy is primarily based on an active cottage industry in walrus ivory carving and a small declining reindeer herd.

Little Diomede Island is of much the same geological composition as Cape Prince of Wales, 35 kilometres to the east, constituting a rugged bastion of granite 3 kilometres across, rising to 430 metres in the centre. The village of Ignaluk, commonly refrred to as Little Diomede village, has a population of approximately 85. Walrus ivory carving provides the main economic basis.

II Northwestern Alaska

Kivalina

The village of Kivalina is located on a barrier island of the Chukchi Sea, 75 kilometres northwest of Cape Krusenstern (67°58'30"N, 164°32'30"W). The current population of 188 subsists mainly on a hunting and fishing economy.

Point Hope

Point Hope (68°21'N, 166°47'W), is situated on a prominent barrier beach jutting into the Chukchi Sea. The native village bases its existence mainly on the fact that ocean currents and ice conditions bring the migratory marine mammals closer to the coast here than anywhere else along the coast of northwestern Alaska. The current population is 386.

Directly to the east of Point Hope a flat marine planation plain extends several miles inland to a cliff forming the old shoreline of the Arctic foothills. The cliff ranges from a few metres to over 300 metres in height. Inland the surface rises to over 1000 metres, with general altitudes between 150 and 300 metres. The Kukpuk River, the largest in the area, flows into Marrayat Inlet a few miles to the northeast of Point Hope.

Wainwright

The village of Wainwright (70°38'15"N, 160°01'45"W), lies on the Chukchi Sea coast, about 136 kilometres southwest of Barrow. Ice conditions here are less favourable than at Point Hope or Barrow as the leads usually open much further offshore.

Barrow

The community of Barrow (71°17'30"N, 156°47'15"W), with a current population of 2100, is the ninth largest in Alaska, and

the state's largest Eskimo community. The town is located on a low spit of sand and gravel 16 kilometres southwest of Point Barrow.

In this region the shoreline of the Arctic coast is marked nearly everywhere by low-lying cliffs on the mainland and by more or less continuous sand reefs offshore. The coastal plain south of Barrow is striking for the uniformity and monotony of its landscape. Prominent landmarks are entirely absent and there are very many lakes. Barrow is the only Alaskan community where both spring and fall whaling are regularly pursued.

Sea Ice Cycle

The Bowhead is to some people known as the "ice whale" because of its affinity for the edge of the pack ice or for openings in it (see Appendix II). The distribution of the ice determines the distribution of the whales as well as the distribution of all other marine mammals important to man along the coast of Alaska. This all-governing cycle of sea ice in the Bering and Chukchi Seas is only being documented to any degree of reliability with the advent of remote sensing by satellite.

Ice formation in the Bering Sea usually begins in October and the ice edge reaches its maximum southern position during late March.

Ice in the Bering and Chukchi Seas exists in three major zonal systems: the thin and relatively stable fast ice under one year old; the area of deformed and moving ice known as the shear zone; and the seasonal and multi-year pack ice.

Fast ice (sometimes called land fast ice), is attached to the shore. As freezing begins in the fall, new ice forms along the shore and slowly builds seaward. It often freezes to the bottom in shallow waters near land and by the end of winter typically extends outwards to the 10 to 20 metre depth contour where it may reach a maximum thickness of about 2 metres.

The seaward extent of the fast ice zone depends on the exposure of the coast, the depth of the water, the time of the year, and the interaction of the fast ice with pack ice. Movement of the fast ice is minimal, hence its name. The overall appearance of the ice depends largely on the roughness of the sea at the time of formation, as well as the arrangement

of old ice frozen into the surface.

The interaction region between the pack ice and the edge of the fast ice is called the shear zone. At this margin pressure ridges and hummocks are most often created, typically being from 2 to 4 metres high with keels of much greater depth. In the shear zone strong forces act on the ice and constantly produce open water leads known as flaw leads that freeze and form new seasonal ice which in turn is deformed by pressure. The pack ice zone beyond the shear zone consists predominantly of multi-year floes from 2 to 4 metres thick that are constantly in motion.

The sea ice of the Beaufort and Chukchi Seas is never a solid mass. Some leads - large linear openings in the ice - and polynyas - large non-linear openings in the ice - are always present because of the winds and currents. For example a lead recurs off Point Barrow where open water may be as much as 30 kilometres or more in width at times. Polynyas may be found in the same place each year due to constant ocean currents and winds, or be formed at the mouths of major rivers where the inflow of river water keeps the ice from forming.

Sea ice in winter is fairly solid in the Chukchi Sea although many leads are present along the Alaskan coast, particularly between Cape Lisburne and Icy Cape where strong longshore currents exist.

In Bering Strait extensive ice pressure builds up due to its geographic constriction. This takes place throughout the ice season and presents a dynamic shear zone area with winter ice thickness averaging between 30 and 120 cm. Ice is present

in the Beaufort Sea 8 to 10 months a year (occasionally 12), whereas in the southeastern Chukchi Sea the period of ice cover is about 7 to 8 months each year. In the Bering Sea, ice is present between 6 and 8 months in the northern part and only a few months in the southern part.

The sea ice around the west coast of Alaska has many forms and is extremely variable. The sea ice is beyond any question the single most important factor governing the subsistence hunting activities of the indigenous Eskimo people.

Ice and animal life

The distribution and abundance of marine mammals along the western and northern coasts directly reflect the combined effect or effects of water and ice movements, bottom characteristics and the availability of suitable food.

The Bering, Chukchi and Beaufort Seas abound with a great variety of marine mammals, nearly all of which play a role in varying degrees of importance, to the subsistence hunter.

The natural environment of direct concern to the subsistence hunter is the one to which he has direct access, and in which his material technological ability allows the exploitation and utilization of that environment to a particular level. Although historically resource utilization along the western coastal regions did cover a much wider spectrum of the biotic environment, the current pattern of settlement distribution reflects to some extent the historic importance of proximity to game resources.

Roughly these mammals can be divided into ice-loving and non-ice-loving, depending on their degree of dependence and contact with the ice. For the ice-loving species ice takes the place of land and provides hauling grounds for resting and rearing young. Characteristically the Bowhead whale, Beluga whale, polar bear, Ringed Seals and walrus maintain regular contact with the ice.

Walrus (Odobenus rosmarus) inhabit the edge of the drifting pack ice, and in the springtime migrate northwards with the receding pack. Polar bears (Thalarctos maritimus) are especially abundant in the Chukchi Sea, north of the Bering Strait, and reside primarily on the unbroken pack, except for denning females

which in certain locations might be found as far as 40 kilometres inland. During the winter months polar bears are found in fair abundance in the neighbourhood of coastal villages as far south as Saint Lawrence Island, and large numbers are shot in the villages when rummaging through garbage bags and cans. There is quite frequent hunting of walrus by natives, but little of polar bears.

Ringed Seals (Pusa hispida) are the most abundant as long as fast ice is present, but they spend the summer at the edge of the drifting pack, well out of the reach of most village hunters, except at Barrow, where the pack edge is often visible from shore. Harbour or Spotted Seals (Phoca vitulina) are the most common species during the open water season and are harvested by hunters throughout the summer wherever a head bobs up within shooting range. Bearded Seal or Ugruk (Erignathus barbatus) are most common during their spring and fall migrations, but are abundant in certain localities throughout the summer.

Of the ten species of whales known to occur in the Bering and Chukchi Seas, Humpbacks (Megaptera novaeangliae) are the least abundant since they prefer ice-free waters.

Grey whales (Eschrichtius robustus) are seen in the greatest numbers during their migrations in the spring and fall, when they pass through the Bering Straits.

Bowhead whales (Balaena mysticetus) are the most important whales to the native subsistence hunter and are discussed in greater detail separately. Other species of whales listed in the table of marine mammals of the Bering and Chukchi Seas (see Appendix II) are of little importance to the subsistence whaler,

as they are either too fast to be practically hunted with the means available and/or sink when killed.

Much of what we know about the Bowhead today stems from the practical knowledge of the nineteenth century whaler captains who recorded the distribution, oil content and baleen content in their ships' logbooks as a matter of business discipline.

The Bowhead is also known as "ice whale", "Right whale", "Greenland whale" and to the western Eskimo as Ahvik, Kai-ra-lik if large or u-sing-wa-chak if a very large one and ing-o-tok if only a small one. There actually is still some question whether or not the small whale ing-o-tok is a separate species from the larger one as is claimed by the Eskimo whalers at Barrow.

The most striking features of the Bowhead whale are its plump body, its enormous head which makes up one-third of the total body length, its strongly arched jaws and the extremely long flexible whale bone which hangs from the upper jaws.

A white area covering the chin and the front portion of the lower jaws is characteristic of the Bowhead whale, which is further distinguished from all other whales by the total absence of dorsal fins or humps.

The Bowhead is considered black, but it is actually dark grey with a tinge of colour. All whales have a play of colour which usually fades after death.

A female Bowhead may reach lengths of up to 20 metres and its longest baleen (whalebone), found in the middle of the upper jaws, grows up to 5½ metres in length. In all species of baleen whale the females grow larger than the males.

The Bowhead's method of feeding is to swim rapidly with

its mouth open through a field of shrimp-like crustaceans that live at between 10 and 20 metres depth, and when full he closes his mouth and pushes his tongue forward, forcing out the water.

Usually Bowheads do not dive much deeper than to 25 metres, although when frightened or struck they can dive to 100 or even 200 metres if water depths permit.

Bowheads, when attacked, have sounded deeply and stayed down longer than usual; they return to the surface obviously exhausted and often dazed, in which condition they are easily killed as they have to stay at the surface longer than usual to recover.

A Bowhead seldom stays at the surface for more than two or three minutes at a time (except when feeding), in which short period he spouts seven to ten times. He then rounds out (hunches his back out of the water) and turns flukes (lifts tail in the air) preliminary to sounding (diving). He stays down usually only five to fifteen minutes.

When attacked a Bowhead is apt to sound vertically to maximum depth, often burying himself in the muddy bottom. Scammon (1948) records an occasion where one stayed down for one hour and twenty minutes.

The efficiency of swimming in whales is very high, for the animal moves its flukes (tail) up and down in a comparatively slow motion, with noticeable side to side motion, and the large flukes displace a large volume of water astern with less loss of kinetic energy than if a smaller volume were displaced at greater speed. A Bowhead can attain a swimming speed of twenty knots for up to ten minutes when chased, although the average speed is between two and five knots. The tail of a large whale

would be about 7 to 8 metres broad and up to 1 metre deep. Eskimo whalers believe that whales sleep on the surface of the water and on occasion can easily be approached by a boat. Ashley (1926) reports that when frightened Bowheads have a trick of sagging or "hollowing" the back. This causes the blubber to become limp and if an iron is darted at this "slack blubber" it will not penetrate. The iron will generally fall back into the water with the shank bent double. I have not been able to confirm this with Eskimo whalers, however they contend that certain whales have much tougher skins than others. The skin of whales, like all mammals, consists of an outer epidermis, an inner epidermis or corium, and subcutaneous connective tissue (blubber). The Bowhead epidermis is made up of an approximate 7 mm thick layer of living cells and an outer cornified layer about 2 mm thick. The dermis is a thin layer of tough connective tissue immediately under the epidermis and contains no fat. It is less than 0.5 mm thick and this is the reason skins of Bowhead whales cannot be made into leather.

Below the whale's dermis lies the blubber which may best be compared to another subcutaneous fatty layer - bacon, which it actually resembles, when boiled, not only in appearance but in taste as well. The western Eskimos much favour the skin with a thick layer of blubber attached, which is eaten either raw or boiled and known as "muktuk".

The extreme thickness of blubber on a fat Bowhead is in the neighbourhood of 60 cm, however usually between 30 and 45 cm. When butchering a whale it is often noted that the meat is a very deep red, this is because it contains a great amount of

myoglobin, a substance with a great affinity for oxygen and resembling haemoglobin, the oxygen transporter of the blood. The myoglobin is thought to allow the whale to be able to make prolonged dives, even though its lung capacity is relatively limited.

When seeing the whale head-on, the spout of the Bowhead appears to be a double V-shaped vertical blow, or a single spout or geyser when viewed laterally. It is 3 to 4 metres high and consists of atomized and condensed moisture. After sounding a smooth oily slick remains on the surface, for only seconds, at the exact spot it turned its flukes.

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History

Description of pre-contact whaling

A certain amount of historical knowledge is essential in understanding the modern Eskimo subsistence whaler. The whaler of today, omitting at this stage the word 'subsistence', is a product of a social evolutionary process that has been relatively well documented both in abstract and "real" terms. One of the most comprehensive and detailed is that by Spencer (1959) entitled "The north Alaskan Eskimo". Spencer, in his section of the "cult of the whale" gives one of the most concise and authoritative reconstructions of the pre-contact whaling activities of the north-western Eskimo. When checked against other works available Spencer is correct in every detail and the following description of aboriginal whaling is an abstract from his work.

Preparations for the coming whaling season started very early in the spring, as soon as daylight returned. The umialik, or boat captain, usually had been involved throughout the winter in making ceremonial regalia such as banners and charms. By early March preparations for the whaling season was the single most important activity for virtually every man along the coast.

Cultural and religious taboos demanded that every weapon and implement had to be carefully cleaned before the hunt could start. The umiak (or skinboat) required a complete new cover of hides, either walrus or Bearded Seal depending on the location along the coast. The umiak frame was stripped of its old cover and washed with urine. Every whaler participating had to have a complete new set of clothes sewn as the whale could only be approached in clothing that had not previously been used in hunting.

All the sewing was done by the wives of crew members under the supervision of the wife of the umialik. After completion of the umiak skin the crew and their wives would eat together to signalise its readiness for the sea.

When the ice conditions were right and the first whales had been sighted the crew underwent four days of preparation before going out on the ice to set up camp. In the meeting house they would dress in the new clothing the wives had made.

After the whaling was over this clothing would be cleaned and worn for any occasion though never again for whaling.

After dressing in the new clothes four days of strict meditation followed; the men would sit quietly and think about whales and sing whaling songs.

The wife of the umialik, meanwhile, was engaged in certain rites surrounding the umiak to be used in the whaling. It was also essential that the umialik had his ice cellar cleaned of meat, particularly the flesh of any whales previously taken and distributed to crew members who ate it during the four days of meditation. When the last meat had been eaten at sundown the crew left the meeting house and would go to the house of the umialik to fetch the whaling tools, the lances, the floats and the lines. These were then loaded into the boat and each man taking a hold of the gunwale, they began the run to the sea. Dogs were never used to transport the umiak or any part of a captured whale on the ice as no dogs were permitted on the ice. These, it was held, would be offensive to the whale.

At the edge of the shore-fast ice the umiak was set down, all the men got in and pretended to be paddling vigorously, the

harpooner pretending to lance a whale, and the umialik sang a special whaling song.

When this ritual was over, the umiak was advanced to the open water and all the gear in the boat carefully arranged in the proper places. Once in the water the boat was slowly paddled towards the north, the direction the whales would swim. All this while the umialik was singing the proper songs to attract whales.

After a time the crew would pick a spot to set up camp. Here at the edge of the ice windbreaks were set up, but no tents. No fires were allowed and there could be no cooking while the whaling was in progress. The men slept in snatches and were constantly alert. Eating was done silently and sparingly. Proper observation of both personal and group food taboos was carefully followed.

All the same taboos applied to the wife of the umialik and to a lesser degree to the wives of the crew members.

They could make no noises, such as chopping wood, or clapping hands together. Noises were said to frighten off the whale with the result that the whale community became quiet when several crews were out. Children were also warned not to make any unnecessary noise.

When a whale was taken a runner was sent from the boat to the umialik's wife who would be the first to be given the news.

All throughout the preparation and actual whaling activities charms and songs played a vital role to ensure success. Each umialik, each harpooner, each crew member had his own personal songs, sung during a particular facet of the preparation, and

charms which were taken along when whaling. The singing of such songs was in part a function of the umialik, alongside the Kaaqliq, the older, more experienced whaler.

The harpooner, haurligax, whose position depended on skill rather than on magical abilities, regularly had songs which he sang over his harpoon; he also had songs to keep the whale from spinning or moving away. Songs were sung during all stages of the whaling. Songs to affect the weather, to open ice leads, to attract whales, to keep the floats attached to the whale, and numerous other songs. Once the dead whale was brought back to the ice no further songs were needed; the compelling magic had had its effect.

This contrast between aboriginal whalers and modern subsistence whalers primarily lies in the technology employed. Murdock (1892), expresses the opinion that since the whale was surrounded by archaic ceremony to a far greater extent than any other animal, the hunting of it likewise requires weapons of an archaic type. However, even in comparison to the harvest of 1975 those methods and weapons seemed to have been highly effective and fully adequate.

Captain Herendeen, a well-known trader and whaler active on the northwest coast of Alaska around the turn of the century, relates how during the season of 1885 a native crew got six big whales with nothing but old-fashioned harpoons and lances, whereas an experienced white crew got only one with the best whaling guns and other "modern" equipment (Brower 1943).

The aboriginal harpoons were of the familiar toggle-head type, consisting of a 2 metre wooden shaft to the end of which

was fitted a detachable ivory harpoon head with a cutting edge of slate about 25 cm long. A thong of walrus hide 30 metres long was fastened to the harpoon head, and led back down the shaft, at the middle of which a small sinew lashing held it tight until the strain came on the line (ibid., p 47).

The function of the harpoon was to secure the sealskin floats to the whale and impede his sounding (diving). Each line had usually two or three floats attached about 30 metres apart.

Once one line was secured in the whale's body, an attempt was made to secure other lines, and finally lance it. The whale had to be stabbed in some vital organ, preferably the heart or lungs.

The lance consisted of a 4 metre long wooden shaft with a flint head, the size of a man's hand, set into the shaft with a bone wedge.

Lances were never thrown but always stabbed at close range. The harpooner thrust his lance again and again in the effort to kill the whale. The crewmen would hold the lines and draw the umiak close to the whale. Songs over the lance aided in locating the vital spot. Extremely brave and skilled harpooners would often lance near the flukes to hamstring the whale by cutting tendons to prevent it from diving. Often more than one boat would pursue the same whale; however the boat which fastened the first harpoon could claim credit for the whale, and manage the towing back to shore.

The carcase was towed to the ice edge where it could be readily pulled ashore. During the towing the flippers were

lashed to the body to reduce the drag while towing. A ramp was chopped and with a walrus line attached to the small of the tail, the whale was hauled up the ice as far as possible.

A walrus hide line was rove several times through slits in the whale and over 1 metre slabs of ice through a deadman (toggles) in the ice 3 metres back. Then a piece of driftwood was rammed between the lines and twisted in windlass style (ibid., p.54). The whole process was repeated until the whale was beached, upon which it was marked at once for cutting and division. The ceremonial greeting of the whale was conducted by the wife of the umialik, by pouring fresh water on the spout hole and remarking as she poured, "It is good that you have come to us." Next the umialik also poured water on the snout, remarking, "Here is water; you will want to drink. Next spring come back to our boat." The wives of members of the crew would then come forward to offer a word of thanks and the umialik concluded by saying, "It is good that you have wished to come and live with us." The whale was now ready for butchering. Everyone present would cut away as much muktuk as they could carry themselves. This reflected the generosity of the crew and the umialik. The actual division of the rest of the whale was a crew matter and worked out between the crews of the boats which assisted. The flukes together with the heart constituted the preferred parts and were reserved for the boat-owner as his share. Each crew member received muktuk, meat sections of the internal organs, bone and baleen. Cutters of flint set into bone, forming a regular saw at the end of an eight to ten foot long handle were used most commonly. A sort

of boat hook, made from ivory lashed to a pole was used to drag the chunks of meat and blubber away from the carcase during cutting. The final act before hauling all the meat to shore was assembling the pieces on the ice to make an outline of the body, flukes, blowhole in place (ibid., p.55).

The close of the whaling season was marked by several days of gorging of food and ceremonial events, including a dance that involved the entire community.

When all had eaten their fill, preparations were made for the outdoor feast, games and contests, culminating in the blanket toss (nulakataq) on the third or fourth day. The outdoor festival of nulakataq is perhaps the only whaling activity that has remained left unchanged until now.

The nulakataq, with its distribution of food, its feasting and its merrymaking was primarily a social occasion which accounts, perhaps, for the fact that it was never much influenced by the restrictions which the Church placed on the supernatural aspects of whaling. It was held that the merrymaking was for the benefit of the whale, "to let the whale know we are happy."

In the Barrow area, as well as every whaling community along the west coast of Alaska, the cult and "primitive" ceremonial elements have either been totally suppressed or supplanted by Christian religious beliefs.

Later historical development

As early as the 1890's Eskimo aboriginal whaling methods, which included the elaborate ceremonial cult, were largely superceded by western equipment (Brower 1943).

After the advent of Christian missionaries the equipment, boats and crew received their blessing before setting off to the ice edge (Richards 1949). White man's food, bread and tea, were at first taboo on the ice, but became quickly accepted after the white shore whalers proved the ineffectiveness of the taboos.

Around the turn of the century the native whalers had fully copied the pattern of practices of white flaw whalers, who had also been hunting Bowhead whales for twenty years or so in those areas.

Darting guns, shoulder guns (which hastened the kill) and wooden Yankee whale boats were used almost exclusively. A darting gun (see Figure 10) is a smooth bore, 8-gauge, barrel attached to the end of the harpoon shaft. It enabled the harpooner to shoot a small bomb (see Figure 5) into the whale the instant he harpooned the animal. The darting iron is the peculiar harpoon of the darting gun.

The shoulder gun (see Figure 2) is an 8-gauge smooth bore breech-loading gun, constructed entirely of brass. The gun fired a bomb similar to that of the darting gun, and enabled the whaler to dispatch a whale out of range of the lethal flukes, without having to lance the animal.

The comforts of tents and hot food, bread, tea, dogs for hauling heavy sleds on the ice, became standard practice.

Development of Whaling

It is possible to distinguish three distinct phases of development in techniques and deployment of equipment, after contact with Yankee whalers.

First phase (1850-1908)

The first phase covers the period from initial contact during the early 1850's until the collapse of the Yankee whaling industry when the bottom fell out of the baleen market in 1908. During this period, the greatest change in whaling techniques and related social culture took place along the entire western seaboard of Alaska.

The destruction of the entire arctic Yankee whaling fleet of the 1871 season, when thirty-three vessels were crushed in the ice off Point Belcher, was perhaps the greatest windfall that ever befell the Eskimo whalers. In 1876 twelve more vessels were frozen in for the winter and had to be abandoned with tremendous losses in property.

Much-desired white man's whaling equipment which had previously been unavailable to the Eskimos came from these disasters. Darting guns, shoulder guns and bombs had been a monopoly of the Yankee whalers, as many captains refused to sell these and many other items to the Eskimos for fear of loss of monopoly (Brower 1943). It was not uncommon that a group of Eskimos would order the crew of a beset or beached ship to get off, or in other cases simply started looting the desired equipment while the crew watched powerless to stop what was going on.

Many of the whaleboats, guns and harpoons were acquired, however, from direct trade with the whaling captains after the

trade restrictions imposed by the shipowners crumbled under the competition from freetraders.

The period from 1890 to 1910 was one of great prosperity for the Eskimo whalers. Flaw or shore whaling on the pattern of Yankee whalers became fully established. Inter-tribal warfare and competition, lack of skill and equipment had prevented the caribou hunters from the interior since time immemorial from establishing themselves on the coast, but under the umbrella of American law and order they were for the first time free to come and go as they pleased. They flocked to the coast to partake in the new industry. The coastal whaling locations were jealously defended from any competitors by the established residents. The first white whalers were not treated much differently from Eskimo intruders.

The native village at Cape Prince of Wales, Keengegan, had a particularly unsavoury reputation and was for many years avoided following a bloody encounter between natives and whalers in 1877, leaving 13 natives dead (Thornton 1931). When the baleen prices went as high as $7.00 a pound it was possible to buy a wooden whaleboat entirely equipped with oars, sail, harpoon gun, lines and bombs for only six large pieces of baleen (Hughes 1960). Although it would seem that the Eskimo in such a transaction gained the most, the price obtained for the quantity of baleen far exceeded the value of the boat and gear.

The composition of whaling crews became less strictly regulated. Women and interior unskilled natives were now allowed as crew members for the lack of enough experienced men (Brower 1943).

Many Eskimos were employed by white whalers, traders, the government and church, and others whaled independently, selling their baleen to the highest bidder. Never before had the previously neolithic subsistence hunters achieved such levels of material wealth. However, hand in hand with the virtues of western civilisation came the vices.

Alcohol and diseases such as measles, smallpox, cholera and influenza, unknown before contact, claimed many victims among the coastal Eskimos. In 1880 Captain C.L. Hooper, in command of the U.S. Revenue steamer Corwin stopped at Saint Lawrence Island to investigate reports of the starvation of large numbers of the Eskimos during the winter of 1878-79. Captain Hooper found that probably 1000 people out of a population of around 1500 had actually perished during that winter. Whisky, acquired from whalers, is often thought to be responsible for the disaster. It was claimed that the natives after a prolonged drinking spree had failed to lay in a supply of walrus and other game when it was available and as a result starved during the following winter which proved to be extraordinarily harsh. That liquor was not the sole cause, but an epidemic as well seems to be clear from the fact that meat was found in the caches at some of the villages where all of the people had died (Collins 1937). Much of the lack of success of certain whaling crews of native villages on the coast near Barrow during several seasons was directly attributed to drinking sprees of home-brewed liquor (Brower 1943).

The transition period between the first phase and the second phase started with the collapse of the whaling industry in 1908 and culminated with the 'flu epidemic of 1918 which

completely ravaged the coast.

Second phase (1908-1960)

The second phase in the development of Eskimo whaling after white contact is characterized by the abandonment of commercial whaling due to the collapse of the market and a return to subsistence whaling with modern equipment and wooden boats. Fur trapping during this era was the main source of cash income, and the reliance on western goods was firmly rooted by now. The reindeer herding industry reached its peak during this phase, providing an important source of food and cash for native herd owners. In the forty years following their original importation the "mother stock" of 1200 animals in 1902 had multiplied to nearly three-quarters of a million animals by 1929 (Lomen 1954).

The reindeer industry had been conceived by Dr Sheldon Jackson to function as a permanent supply of food and clothes for the natives on account of the wholesale destruction of game, by white men and natives alike, during the first phase.

The Russians, after contact with the Alaskan natives, had discouraged the use of firearms. The Americans at first forbade the sale of modern breech-loading guns to the natives by the whalers and traders. Later, after the acquisition of modern breech-loading guns, hunting increased and game dwindled.

The once-plentiful walrus herds had been decimated by Yankee whalers, who on the way north took them instead of whales when the ice conditions did not allow whaling. Walrus yielded acceptable quantities of oil and ivory when nothing better was to be had.

With game populations ruined, human populations decimated

by disease and cultural bonds shattered by missionaries during the first phase, the second phase can be considered as an era of relative prosperity and stability for the Eskimo of western Alaska.

Although it is widely claimed in the literature that the stocks of Bowhead whales had been harvested well beyond sustainable yield levels, there is no evidence for this in the available harvest figures by the traditional whaling communities. The harvests of Bowheads had been commensurate with the needs of the community, which generally meant that once the ice cellars of the community had been filled with whale meat the hunt ceased. Missionaries forbade hunting, including the taking of whales, on Surday, a rule which was generally well adhered to (Brower 1943).

During the second phase whaling became very much of a subsistence activity, since the commercial basis had fallen away in 1908. It became, however, a subsistence activity with an odd Yankee character.

The material culture was wholly Yankee with wooden whale boats, brass shoulder guns, darting guns, steel cutting implements, block and tackle, flags to mark the taking of whales. The wooden whaling boats were in general not as well suited for flaw whaling as were the aboriginal skin boats as they were much heavier and more vulnerable to ice damage, nor were they as easy to repair. The shoulder and darting guns were expensive to operate as each attack on a whale with two darting guns and a shoulder gun cost the equivalent of a full day's wages. In addition the use of these weapons often proved more dangerous than the flaying flukes of the whale itself, as the safety provisions were not very adequate. Bombs commonly exploded

in the barrels of the shoulder guns, maiming members of the crew, or did not explode at all after being fired into the whale. Although whaling still maintained an important position in the annual and social-cultural cycle of the Eskimo it was equalled by fur trapping, reindeer herding and occasional wage-labour.

Diet now included such items as tea, sugar, bread, raisins, and beans, all of which could only be bought with cash or credit from furs, at the white trading stations along the coast.

In areas where driftwood was scarce, whale and seal oil were still used to heat and light, although parafin was commonly in use during the nineteen-twenties and thirties.

Many of the traditional Eskimo uses of whale products had been supplanted by "modern" mass manufactured items available in the local trading posts. Braided baleen fish lines, boat and sled lashings were displaced by cotton or hemp line and rope. Steel spring and coil traps, and snares for fur trapping purposes were much superior to the aboriginal baleen counterparts, especially since a trapper needs often many hundreds of one particular type. Baleen cups, dishes and dippers were inferior to metal and copper ones, which were readily available. The practical use of baleen as knife blades for cutting blubber (Murdock 1885) was rapidly displaced by steel knives.

To some extent the large ribs and jaw bones remained in use for building purposes, since other home building materials were costly and hard to come by.

Until the closing of the second phase the less desirable whale parts were a very important source of dog food, as dogs were still the most common form of transportation.

It could be said that flaw whaling as practised by western Alaskan Eskimos became somehow stabilized during the second phase. There was to some extent a relapse into the use of the aboriginal skin boats as the expensive wooden whaleboats became gradually unserviceable through wear and damage.

Towards the end of the second phase the wooden whaleboats had in most coastal communities been replaced by aboriginal skinboats, or umiaks, propelled by either sails or paddles. The outboard motor was used to some extent in coastal river travel, as early as the mid-nineteen twenties, but was considered unsuitable for whaling purposes because of the noise factor.

The brief renaissance of whaling as an important subsistence activity was brought about by the decline of the reindeer industry during the war years coinciding approximately with the decline of the fur trade.

Third phase (1960-1977, October 20)

The third phase in the development of Eskimo whaling was heralded by the arrival of many wage-earning possibilities, such as the construction of the Distant Early Warning Line radar stations, other military activities, and oil development which was to culminate in the construction of the TransAlaska Oil Pipeline. Later the first payments to the Regional Native Corporations under the Native Land Claims Settlement Act of 1971 were made. Thus money for outfitting whaling crews became available. Detailed examples of third phase hunting are given in Personal observations of modern subsistence whaling.

The phase came to a close on October 20, 1977 when the International Whaling Commission ban on the taking of Bowhead whales was accepted by the United States Government.

OBSERVATION AND ANALYSIS

Subsistence hunting - General discussion

By definition subsistence hunting is hunting to support an independent existence; however its exact meaning varies with the individual discussing the topic. The anthropologist generally believes subsistence hunting can be carried on regardless of the degree of acculturation of the group in question, in this case western Alaskan Eskimos. To the pragmatic wildlife management biologist, subsistence hunting is the form of hunting as conducted by pre-white contact Eskimos, independent of modern technological aids. To the Eskimo, subsistence hunting is simply an abstract definition having little meaning except when he is directly affected as in the case of the October 20, 1977 International Whaling Commission ban on the taking of Bowhead whales for any purpose including "subsistence".

The hunting of game by aboriginal means, whether of marine or land animals, is an activity requiring physical skills and mental abilities no longer possessed by contemporary hunters. Historically the skill of the hunter was directly coupled to his ability to manufacture a great variety of hunting implements, a need totally eliminated by the introduction of the gun, aluminium boats and countless other technological aids including walkie-talkies. The subsistence hunter in the old sense no longer exists.

Aboriginal Alaskan natives completely used the biological resources of the land and sea in balance with their sustained human carrying capacity, and this exploitation was only limited in scope and amount by the technology employed. Hunters would

hunt an area or localized animal population until a certain low yield was reached and then move on. For the interior, non-marine-oriented hunting groups, mobility was an adaptation to low yields; however, in certain areas along the coast yields maintained levels that allowed a sedentary exploitation pattern, for instance where leads occurred.

Subsistence whaling by the modern Eskimos is essentially a sedentary activity, the success of which depends entirely on the number of whales coming to the hunter, as compared to an active pursuit by a highly mobile group. As a result flaw whaling (i.e. in the flaw lead) is more commonly pursued than most other forms of subsistence activities for various reasons. In flaw whaling physical energy and time expended are less lengthy and severe than most other forms of hunting. Most members of the whaling crew can return home to the village which is often only a few miles away, to recuperate and take a break from the ice, whereas on a caribou hunting expedition the pursuit is continuous and physically and materially much more demanding, and the chance of the snowmobile breaking down and the men getting stranded many miles from the village is very real.

Competition for game resources by Eskimos has become fierce largely as a result of population expansion, increased material wealth in the form of high-powered telescopic rifles, outboard motors, snowmobiles and portable radio transceivers. These were largely in turn responsible for imposition of limited hunting seasons for all species of game as the yields were not any longer limited by primitive technology.

Many natives in western Alaska proclaim that they are going

on a "camping trip" when leaving the village overnight on a hunting trip. If absent for more than a few nights from the village it is generally referred to as a hunting trip.

The modern Eskimo hunter may be seen from three separate viewpoints. The first is that of his own social group in the community in which he lives, subject to the current locally accepted standards of practice. These standards are a direct product of the degree of native acculturation. The second is that of the uninitiated white, whether visitor or administrator, who casually observes the hunting practices, or results thereof, and draws his conclusions subject to Western ethics of hunting, utilization of game, and standards of hygiene. The third is that of the law enforcement officer or the wildlife management biologist who, mindful of the biological management principles of maximum sustainable yield levels, dictates when and how the subsistence hunter can take his game.

State of Alaska hunting regulations make no distinction between native and non-native hunters; however they do make provision for subsistence hunters in offering a so-called "subsistence licence" for the nominal price of twenty-five cents. The regulations stipulate that "the applicant is only eligible if he or she is solely dependent upon him/her/self for support, upon proof presented by the applicant that the applicant (A) is obtaining or has obtained assistance during the preceding six months under any state or federal program to aid the indigent, or (B) has an annual family gross income of less than $3600 for the year preceding application". (A.D.F.G. 1977)

Whales and all other marine mammals (except walrus), are

outside the regulatory jurisdiction of the State government, and are instead administered by the Department of Commerce of the Federal Government.

Subsistence hunting as generally understood hardly exists any more. What remains is a blend of tradition and sport.

Personal observations of modern subsistence whaling (photographs at back)

The author of this paper has had the good fortune to witness at two different locations over a period of two years some of the developments of the last two whaling seasons that were partially responsible for the I.W.C. moratorium on October 20, 1977.

In 1976, one week was spent at Barrow from May 5 until May 12 and two weeks were spent at Cape Prince of Wales on the Bering Strait from May 28 to June 10. Again in April 1977 a visit was made to Barrow; however, no field observations were possible this time, due to the unwillingness of whaling captains to allow white independent observers in the whaling camps, in the mistaken belief that this was ruled out by the Marine Mammal Protection Act. Cape Prince of Wales was again visited in 1977 from May 5 to 15 and in July and August for several days.

It can be assumed that one of the few elements in whaling that did not change over the course of the century is the biology, behaviour and distribution of the whale itself. Whether or not actual numbers have fluctuated is much open to conjecture.

Preparations for the spring whaling season are not as elaborate as they once were. The whaling captain, however, still occupies the same relative social status as his neolithic ancestor, and still the most respected mark of manhood in the coastal Eskimo communities is to have a whale kill to one's credit. With the elaborate ceremonialism and the manufacture of new hunting implements gone, the preparation for spring whaling often depends merely on the amount of cash available.

With an unusual amount of construction jobs available on the oil pipeline and other construction projects, money was

less of a problem than ever before. All construction jobs were paid on a union scale, which averaged about 15 dollars per hour. Long hours, with union regulated scales for overtime and Sunday work, allowed some men to bring home as much as $3000 per month, after taxes. The traditional custom that the captain supplied all the equipment and food still holds, except for the fact perhaps that he does not have to "buy" his crew members with food and gifts.

Many aspiring natives who previously could not afford the tremendous cash layout for a complete whaling outfit could now do so with their big earnings, although few actually had the skill and experience to be properly considered a captain.

Refer to Appendix IV for a breakdown of the basic equipment used by the crew observed while whaling.

Not all of the equipment was owned or supplied by the captain. Each crew member owned and used his own skidoo and sled, sleeping bag, rifle, binoculars, and in some cases a tent and cooking utensils. The weekly grocery bill was wholly the responsibility of the captain. Since the majority of food items available in Barrow are air freighted from Fairbanks or Anchorage, all items are expensive, and the cost of living is high: bread is $2.00 per loaf, eggs $2.00 per dozen, butter $3.20 for a pound can, milk $1.10 per can, Danish bacon $3.10 per pound can and Coca Cola 60¢ per can. Fuel for the outboards and snow machines is cheapest vy the 55 gallon drum which costs about $80.

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The annually occurring lead off Barrow opened on May 5 several miles offshore and throughout the day there was a constant activity of families travelling from the village by snow machine.

No dog teams were observed at any time on the ice, or being used elsewhere.

Several of the younger men wore high-powered handguns, .375 cal. or 44 mag.cal. in a holster over their outer parka, especially during the snow machine rides to and from the lead when polar bears were sometimes encountered.

The nearly continuous hours of daylight allowed a constant watch, which was conducted by two or three men, while the rest of the crew, seven in total, either slept, ate, drank coffee, played cards or smoked marihuana in the eight by ten walltent set up behind a windbreak next to the skin boats at the ice edge.

The vantage point selected was in common with the traditionally preferred spots where a small isthmus of ice would jut out into the lead, presenting an obstacle to the swimming whales, which would either sound before or after passing under this ice mass.

On May 5, around 8 o'clock in the morning, our crew killed with two bombs, one from the darting iron and one from a shoulder gun, a thirty-six foot long female bowhead whale. The whale had been sighted approximately 50 metres from the point while surfacing and was approached by paddling only, however, with the outboard engine on the boat in tilt position. The euphoric state of several of the crew members after having to discard the marihuana cigarette which they had been sharing did not seem to distract from their function as paddlers. The darting gun was "pitched" (never thrown) by the harpooner, who was in this case the captain. After approaching within 10 metres of the whale, a second man at once threw overboard the line with its attached

1 metre diameter fluorescent red Norwegian net float, and with a smaller float attached to the end of the approximately 30 metre harpoon line.

As soon as the line was attached to the whale the boat engine was started, and used for the further pursuit of the wounded whale which surfaced within minutes after sounding, several hundred metres from the location at which it was bombed initially, bleeding from the "chimney", or blowhole. One additional shot with the shoulder gun from a distance of 20 metres killed the whale. Upon the victory hoots of the crew a second boat with several women and boys came to their aid in towing the whale to a spot where it could be hauled up. For this a different spot was selected from that of the vantage spotting point, the ice of which was not safe nor could the snow machines and sleds reach it because of the rough ice. The whale was towed by a rope around the small of the tail to a spot where level ice reached to the edge, and tied to the ice. The captain and two men cut the flukes off while the whale was still floating in the water as these would be in the way of expedient handling when hauling the carcase on to the ice - no special flensing cuts were observed to be made, as is commonly the custom before hauling up on to the ice. Meanwhile the crew was joined by several other parties which had temporarily abandoned their camps along the lead to assist in the hauling up and flensing.

A home-made flag was tied to a paddle and positioned prominently on the ice hummock some distance from the camp to indicate the success of the captain. Another flag, a red bandana, was tied to a pole and one of the younger men drove to Barrow to herald

the success and to secure the flag to a small mast on the ridge of the captain's house in the centre of Barrow.

Approximately sixty people had gathered by this time at the whale cutting location, and three tents had been erected - one by the captain and two by the new arrivals.

A slip ramp was chipped to the water level and the whale manoeuvered into place with the aid of ropes and poles. A block and tackle was fastened to a "deadman" (ice bridge) approximately 75 metres back from the edge, and with a longer rope to the small of the whale's tail.

The men did all the preparatory work while the women boiled coffee and muktuk, which was diced and presented to everyone helping with the hauling up.

The whale was hauled up just far enough to allow walking around it, and a short break commenced to allow for the taking of family pictures with the trophy.

The overall atmosphere of the camp was quite festive but no time was wasted cutting up the whale and getting it on to the safety of fast ice, where the danger of breaking loose on a large floe if the wind should suddenly shift, did not exist. The cutting up of the whale was accomplished in less than three hours with literally not a scrap left on the ice other than the large jaw bones and ribs which are not utilized for any purpose.

The aboriginal ceremonial laying out of the whale outline with all the body parts in place is not practised except for the simple apportioning.

Each piece that is cut off is allocated to a specific individual under the constant supervision of the captain who

does little cutting himself. These pieces are dragged in all directions, each owner keeping his well separate from the others. The whale was cut up uninterrupted and when completed the meat and blubber loaded on as many sleds as are available and hauled to Barrow. Here it is simply unloaded on to the snow, next to the entrance to the frame house, and allowed to freeze. The meat and blubber remained outside, untouched for the entire period I was in Barrow, and was on several occasions used as a scent post for stray dogs, although the cache was generally well guarded. Stray dogs are relatively rare, as they are often shot on sight.

None of the members of the crew left the whaling camp to haul meat to Barrow. This was done by men from the village. The watch was resumed in the same fashion as previously and the family camp remained at the butchering site.

At the actual vantage point no children were allowed, and due to the roughness of the ice separating it from the main camp the men ferried back and forth in a 16 ft aluminium skiff which had been brought for this purpose.

May 7, 1977. During the night the wind picked up in force, however it did not shift so much as to necessitate a move of camp on to the shore ice. The lead had opened up to several miles wide, and the opposite side could not readily be discerned. The water became quite choppy showing small whitecaps away from the more sheltered side.

Around nine that morning another single whale surfaced in the small bight of the ice isthmus, and was killed with one shot from a dart gun. The whale did not even as much as sound,

but simply turned slowly in the water until its belly was up.

It was another young female, slightly smaller than the one of the previous day. During the towing of the whale to the ice ramp, however, shooting commenced in another camp further along the lead and the crew was again fully alerted.

Approximately an hour later two boats from the adjacent camp towed an 11 metre female Bowhead to the ice ramp of our camp. The whale had been killed in a wild chase through rough water and was killed entirely by bombs fired from shoulder guns and been initially fired upon while passing within 30 metres of the camp. A total of 12 bombs had been fired, of which two were later recovered from the carcase.

This time two home-made flags were planted on the prominent hummock, and a runner sent to Barrow to tie another bandana to the flagstaff of the house.

The last whale caught was tied next to the first one, and preparations made to haul one at a time up to be flensed.

When the flensing of the first whale was well in progress a warning signal was suddenly given for nobody to stir and to move back from the ice edge.

The entire crowd of perhaps sixty men, women and children froze as if one. A lone Bowhead had surfaced within yards of the slip ramp, facing the small dead female tied to the ice edge. The animal slowly prescribed an arc with its tail keeping the nose pressed against the body of the dead whale as a pivoting point. Only the small hump of the spouthole showed above the surface.

The exhaling sound of the "nudging" whale resembled the

sound of the air escaping from an air mattress when being rolled up. The inhaling sounded very much like a human taking a deep breath of air. While everybody moved away from the ice edge as silently as possible, the captain who had been sitting on a sled next to the tent ran for one of the skin boats at the water's edge. The dart gun in that boat was empty, as it had not been reloaded. He cursed, threw it back, and ran to the other side of the whale being cut up. He nearly slipped into the water when passing in front of the half-dismembered whale.

Having retrieved the loaded shoulder gun from the skin boat he ran back, this time around the tail of the whale, to within several yards of the ice and slowly stalked to the ice edge. The visiting whale had moved back from the carcase several feet and was no directly perpendicular to the ice edge not over 6 metres away, still breathing very audibly.

The captain fired point blank into the whale which was clearly visible through the water. Upon being hit the whale sounded without any motion straight down, the dark body being still visible when the time-delayed bomb exploded 5 seconds later. The report was audible at the surface and sounded much like a light knock of the fist against one's own chin.

A small stream of air bubbles briefly escaped from the entry hole. The whale disappeared without any further sign and was not found during the period I was in the camp.

The crowd which had silently watched the drama before their eyes, came back to life and the flensing recommenced. Both whales were cut up before six o'clock that evening.

Warning had been received that the wind might shift and

break loose the ice the camp was on.

All the boats were drawn back to the fast ice where it was frozen to the bottom, but the complete camp, with stoves, sleeping bags and other personal gear was left in place along the lead for convenience's sake.

Most crews spent the night and the following day in Barrow and returned to the lead on May 8 for only one more day until it became too cold, and the lead froze over.

The lead remained closed until May 13, by which date the captain had retrieved the camping gear from the ice.

The remainder of the period spent at Barrow was devoted to gaining theoretical knowledge.

The finer details of a whaling captain's know-how can only be learned from many years of experience in the boats and ice.

My "tutors" who willingly shared their know-how, impressed upon me that one should always approach a whale on the leeward side, as there is then less chance to become entangled in the harpoon lines with the paddles, or to be blown on to the whale.

The Bowhead upon sounding leaves behind a smooth oily area at the spot it went down. Experienced Eskimo whaling captains maintain that if a boat pulls into the slick, or crosses the path of the whale between him and his slick, the whale instantly notices the drag caused by the boat in its wake and is usually frightened and speeds up.

The normal swimming speed of a Bowhead is between two and five knots, a speed which can easily be attained in a skin boat powered by seven or eight paddles.

A Bowhead is best approached on the right side (left side

of the boat), giving the harpooner a better position to pitch the iron with all force. The bow of the skin boat is brought forward parallel to the whale, to a point opposite the flipper, keeping out of range of the whale's vision. The captain gives the order to dart, and the moment the iron is pitched the boat is swung away from the whale and all hands paddle at full force out of range of the lethal flukes.

Knowledge of local ice conditions is another very important element in spring whaling.

The principal method of learning for the Eskimo is by continued association and especially residence in a particular geographic area for a prolonged period of time. A whaling crew in Barrow, which was camped one quarter of a mile away from the camp I visited was from the village of Wainwright and had come to Barrow because of the generally better ice conditions. Had the number of whaling crews on the ice been small as in Wales the Wainwright crew would have been less likely to move so brazenly into a new area with unknown ice conditions. There would have been less opportunity to simply rely on and mimic the reactions of the more experienced crews. The main determinant allowing ice conditions favourable for whaling in the spring is the wind direction and strength. The rule is that when the wind is offshore nobody ventures far out for fear of being carried off on shifting ice. Strong or prolonged onshore winds are unfavourable since they usually close a lead or push too much pack ice against the fast ice to allow the use of boats.

Mild longshore winds are the most favourable. Historically many hunters, or whalers have been carried off on drifting ice by sudden shifts in wind direction, never to return.

Within the last few years, however, crews in peril on the ice have been rescued by U.S. Coast Guard helicopters stationed at Kodiak in the Gulf of Alaska. The request for rescue is usually made by telephone, present in every village, and the rescue craft can respond usually within hours. Captains therefore do not pay the heavy price they used to pay for lack of skill.

There is a curious lack of enforcement of Coast Guard regulations (U.S. Federal Government) regarding the use of boats and related equipment. Anywhere in the United States a boat longer than 16 feet or a craft powered by auxiliary power in excess of 10 horse power is required to be registered with the regional U.S. Coast Guard office. By Coast Guard regulation each boat is required to have available for every passenger in the boat a Coast Guard approved life jacket. In none of the whaling communities visited were registration numbers observed on any craft, either skin boat or skiff, and none of the skin boats observed carried life jackets for any of the crew members.

On May 6, 1976 during my presence in Barrow, a skin boat was overturned by a whale in rough water, dumping the crew and gear into the very cold water. None of the crew of eight wore life jackets of any sort, and only the immediate efforts of several other crews saved all but one man. The drowned man was later retrieved from under the ice by divers from the Arctic Haval Research Laboratory.

The main cause of the accident could perhaps be attributed to the inexperience of the crew. In the strong wind the whale had been approached from the windward side causing the boat to drift on to the whale just when it sounded, lifting the boat

Within the last few years, however, crews in peril on the ice have been rescued by U.S. Coast Guard helicopters stationed at Kodiak in the Gulf of Alaska. The request for rescue is usually made by telephone, present in every village, and the rescue craft can respond usually within hours. Captains therefore do not pay the heavy price they used to pay for lack of skill.

There is a curious lack of enforcement of Coast Guard regulations (U.S. Federal Government) regarding the use of boats and related equipment. Anywhere in the United States a boat longer than 16 feet or a craft powered by auxiliary power in excess of 10 horse power is required to be registered with the regional U.S. Coast Guard office. By Coast Guard regulation each boat is required to have available for every passenger in the boat a Coast Guard approved life jacket. In none of the whaling communities visited were registration numbers observed on any craft, either skin boat or skiff, and none of the skin boats observed carried life jackets for any of the crew members.

On May 6, 1976 during my presence in Barrow, a skin boat was overturned by a whale in rough water, dumping the crew and gear into the very cold water. None of the crew of eight wore life jackets of any sort, and only the immediate efforts of several other crews saved all but one man. The drowned man was later retrieved from under the ice by divers from the Arctic Haval Research Laboratory.

The main cause of the accident could perhaps be attributed to the inexperience of the crew. In the strong wind the whale had been approached from the windward side causing the boat to drift on to the whale just when it sounded, lifting the boat

on its back clear out of the water, tipping it over, with the resulting loss of equipment and one life. (A Bowhead when sounding hunches, or rounds, its back out of the water).

In 1976, the 36 crews participating in spring whaling at Barrow killed and recovered 13 Bowhead whales, 25 whales were wounded and not recovered.

This high ratio of whales wounded for each one recovered, nearly 2 to 1, is by some observers estimated to be as high as 5 to 1.

The fall season of 1976 produced 10 whales by an unknown number of crews, with no reported losses of wounded whales.

In 1977 a total of 34 crews took 19 Bowhead whales during the spring season. An unknown number of crews took 11 more whales during the fall season, to make 1977 a record high year with 30 whales recovered (see Appendix IV).

If the conservative ratio of 2 to 1 is applied 60 whales were wounded, giving a total kill of 90 whales for 1977.

Conservationists maintain the harvest was far in excess of the dietary requirements of Barrow, and in excess of the maximum sustainable yield limit of the Bowhead whale stocks. The 1977 number of whaling crews was nearly double that of the sixties. Much criticism was voiced about the high number of novice or inexperienced whaling crews, and their manner of operation.

Too many whales were shot without fastening a harpoon and float, especially when swimming close to the ice edge.

About the deployment of shoulder harpoon guns Murdock (1892) relates: "They use them as the white men do for killing harpooned whales, and also, when the leads of open water are

narrow for shooting them as they pass close to the edge of the ice." This unsatisfactory practice of shooting with a shoulder gun without having the harpoon and floats attached first as white whalers did is nowhere mentioned in whaling literature, and it can be assumed to be an Eskimo "adaptation".

Strong conservationist pressure and world opinion forced the United States Government on October 20, 1977 to accept the I.W.C. moratorium on the taking of Bowhead whales.

1976 Season at Cape Prince of Wales

The spring season at Cape Prince of Wales starts generally a week or ten days in advance of the Barrow whaling season.

Wales does not have the favourable lead conditions that are an annually recurring feature of the coast at Barrow, and in addition strong ocean currents through the Bering Strait create some of the most hazardous ice conditions along the Alaskan coast.

Historically Keengegan, or Wales, was renowned as one of the cleanest and most successful hunting villages in western Alaska.

However, after the ravages of the white contact period the village had by 1976 dwindled to a mere third of its size known in historic times. Many of the quaint little wooden houses were empty, some vandalized or otherwise in an advanced state of disrepair.

In 1976 only one man possessed a shoulder gun and a dart gun with enough harpoons and bombs for one season (approximately 10). One other man had a dart gun which was non-functional because of a broken firing pin. The floats were the traditional inflated sealskin pokes, used for walrus hunting as well as whaling.

During the two days ice conditions allowed the village's skinboats to be put in the water, walrus hunting was the primary purpose, but both the dart gun and the shoulder gun were carried. In 1976 crews in Wales possessed 3 skinboats, all of which had been built several years before by a white schoolteacher who had a strong interest in reviving the status of the craft.

Two of the skinboats were deployed during the 1976 spring season, while the third remained on its rack because the owner and several crew members were enrolled in a heavy equipment

operating school in Texas.

Except for the two days of favourable ice conditions, the wind was from the southeast during the entire period, pressing the northward-flowing stream of broken floes hard against the fast ice. From Cape Mountain it could clearly be seen that the Siberian coast was ice free as far east as the Diomede Islands. During the idle days the crew members stayed with their own families, but were called to the boats on several occasions when a slackening or shift of wind seemed imminent. Again in the spring of 1977 I visited the village of Cape Prince of Wales.

Ice conditions were wholly unfavourable for the entire period spent, although some theoretical experience was gained by talking with the captains. One of the boat owners had bought a new shoulder gun over the course of the previous winter and the defunct dart gun had also been reapired. Ice conditions proved bad throughout the season and I learned when I visited the village again in late summer that no whales or walrus had been caught that season.

The hunters in years back would have been quite destitute and unable to feed the village population; however, employment opportunities for the summer of 1977 were very good, resulting from Federal building projects in the village. The main project was a water and sewer line construction being installed over a three-year period.

Fall whaling

Barrow is the only community in Alaska where fall whaling is conducted regularly each year (see Appendix V). The season beings in early September and lasts until freeze-up, usually early October.

Conditions vary considerably between most aspects of fall and spring whaling. Inclement weather, storms, and sub-zero temperatures make fall whaling often a very dangerous undertaking.

Outboard-powered aluminium and plywood skiffs, between 16 and 20 feet in length, are preferred because of their greater speed than skinboats. Outboard engines between 35 and 90 horse power are the most commonly used.

Crews can be as little as two or four, as the need for paddlers does not exist with the use of power boats. Eskimo whalers claim that in the fall whales are much less wary of noise than in the spring, and outboard engines can be freely used throughout every stage of the hunt.

The darting gun, floats and shoulder gun are employed in much the same manner as in the spring whaling.

In the fall the whalers either camp near the beach at Point Barrow, about ten miles to the northeast of the village of Barrow, or live in the village.

Depending on the speed of their boats, the whalers travel between ten and twenty miles, searching for whales during the daylight hours. In the fall, as in the spring, citizen band radios are used by most crews to communicate between the boat and shore as well as any other boat within range. When a whale is killed far offshore, it may take ten to twenty hours to tow it back to shore, sometimes all through the dark night in

rough seas.

As soon as a whale is killed, bacterial decomposition sets in and the whale starts to "cook" or rot in its shell of insulating blubber.

A hole is usually cut in the whale carcase, draining the blood, to delay bacterial action during towing. At the butchering site, on the shore near Point Barrow, the whale is hauled up with the aid of caterpillar tractors. The cutting process is similar to that of the spring, but the meat is hauled to the village in the back of pick-up trucks rather than sleds.

Eleven whales were taken in the fall of 1977, an unusually high number.

National and international regulations

The International Whaling Commission (I.W.C.) was organized under the auspices of the International Convention for the Regulation of Whaling signed in December 1946, in Washington, D.C. by a number of nations interested in whaling.

Previous international agreements had been developed in 1931, primarily to bring about economic stability to the whaling industry, but also to regulate the catches because of concern that the whale resources were not unlimited and were indeed in danger of being grossly depleted (Gambell 1977).

The 1931 Convention undertook the protection of all Right whale stocks, which had been virtually depleted in the North Atlantic and stock was treated on the same basis. Two Articles in the 1931 Convention applied specifically to the Eskimo subsistence whalers:

"Article 4. The taking or killing of the Right whales, which shall be deemed to include North Cape Whales, Greenland /Bowhead/ whales, Southern Right whales, Pacific Right whales and southern Pigmy Right whales, is prohibited."

"Article 2. The present Convention does not apply to aborigines dwelling on the coasts of the territories of the high contracting parties provided that: (1) they only use canoes, pirogues, or other exclusively native craft propelled by oars or sails; (2) they do not carry firearms; (3) they are not in the employment of persons other than aborigines; (4) they are not under contract to deliver the products of their whaling to any third person."

From 1931 until the signing of the 1946 Convention the United States Government literally ignored enforcement of the adopted

regulations as the coastal Eskimo freely continued using explosives as their sole means of catching whales.

The 1931 Rules were amended at the 1946 Convention as follows:

"Schedule 2 It is forbidden to take or kill Grey whales or Right whales except when the meat and products of such whales are to be used exclusively for local consumption by the aborigines."

The above regulations were amended in 1964 to include "or a contracting government on behalf of aborigines".

This option would allow the U.S. Government to harvest the whales for the Eskimo with no restrictions on the type of equipment to be used.

Also the Eskimo under the conditions of the 1946 Convention could legally employ any type of weaponry available including factory ships, harpoon cannons and catcher boats. Lack of adequate finances however left this option unused, but at least the antiquated bomb guns and darting irons could be used in clear conscience.

The U.S. Marine Mammal Protection Act of 1972 paid little attention to Eskimo whaling practices, allowing the continued exploitation of the stocks of Bowhead whales, although the Bowhead was widely acclaimed to be in danger of extinction.

The U.S. National Marine Fisheries Service had for some time, however, been considering a proposed change in the designation of the Bowhead whale - from "endangered" to "depleted". This change would have led to severe or total restrictions on the taking of Bowhead whales independently of the I.W.C. In

response to the continuing pressure of world opinion the I.W.C. adopted, on the basis of the latest scientific advice on the levels of whale stocks, a formal management policy in 1974.

The classification laid down in this policy is divided into three categories according to relative abundance.

"(1) Protection stocks are those which are more than 10% below the level giving maximum sustainable yield. For these stocks there is complete and automatic protection and the species may not be hunted. Classification as a protection stock does not mean that the stock is necessarily endangered, but shows that the I.W.C. has agreed that harvesting will be delayed to speed up the recovery of the stock to its most productive size" (Gambell 1977). All Bowhead whales are included in the "protection stocks", leaving the two other categories, "Sustained management stocks" and "Initial management stocks" an issue only of concern to the large commercial whaling interests. Under the conditions of the 1946 and 1962 Conventions, however, Eskimo were allowed to continue taking unregulated numbers for subsistence purposes.

A moratorium on the taking of Bowhead whales by Eskimo subsistence hunters was unanimously approved by delegates at the I.W.C. meeting in Canberra, Australia, in 1977.

The ban was based primarily on biological data presented by conservationists. The estimated total population of Bowhead whales is open to conjecture (Braham 1977) and Sergeant and Hoek (1974) estimate the number of Bowheads in the Beaufort Sea to be "in the low hundreds". A recent report by Marquette (1977) quotes a population figure by Scheffer of around 2000 whales.

Other reports estimate the population to be about 1000 and steadily increasing (Fay 1975), between 1000 and 3000 (Harry 1973), and 2500 by Durham (1973). Rice (1974) concluded on the basis of catch statistics for Barrow and Point Hope that, although the Eskimos continued to hunt Bowheads, there was no indication of change in the population size during the century.

Many writers have stated, without documentation, that the Bowhead whale population was greatly reduced during the peak of the whaling in the Bering, Chukchi and Beaufort Seas from 1868 to 1884. The statistics show that the catch per vessel fluctuated but showed no downward trend. An estimated average of 219 whales was killed each year during thie period (Schevill, ed., 1974).

Brower recounted seeing one great school of whales of "litterally hundreds" more than thirty miles off the coast near Smith's Bay in 1897, although for the shore whaling stations that same year had been very poor (Brower 1943).

If the population was reasonably stable as the catch statistics indicated the annual catch could hardly have exceeded 5% so the population may have been around 4000 or 5000. With the collapse of the commercial whale fisheries in 1908 the level of catch returned to a quarter of the aboriginal levels at an estimated average of 10 Bowheads taken annually in all of Alaska (Bockstoce 1977, personal communication).

The moratorium on the taking of Bowhead whales does not include the other species of large whales, the Humpback and the Grey whale, which were harvested often incidentally to the Bowhead along the western coast of Alaska. Although much less abundant, the harvest of these species could continue unrestricted. Grey

whales are often sighted in relative abundance in the Bering Strait during their fall migration southward (Anangazuk 1977, personal communication).

The alleged ravages by modern Eskimo subsistence whalers is not the only cause for concern over the Bowhead whale. North Slope oil activities brought about a drastic increase of human activities on and around the breeding grounds of the Bowhead and tended to disrupt their breeding activities. Potential oil spills and future offshore oil exploration cause another serious threat.

The Soviets and Japanese take strong objection to an I.W.C. proposed reduction in Sperm whale catches. The United States in the prime mover of strong conservation measures in the I.W.C., and an objection to the imposed moratorium on Bowhead whales would have seriously hurt this position. The unavoidable conclusion is that Eskimo subsistence whaling is merely a bargaining counter in this controversy. The imposed moratorium is merely an American political tool to achieve some future reduction in the harvest quota of the endangered Sperm whale stocks.

The native groups have accused the U.S. Government of "cultural genocide" and many whalers have stated they will be whaling despite the threat of arrest, $10,000 fines and long jail sentences.

It will be rather difficult for the U.S. Government to maintain the stance it took between 1931 and 1946 when policing was not practical and the problem was non-existent because it was ignored. American and world conservation groups, notably the "Friends of the Earth International", who are accredited

observers to the I.W.C., will undoubtedly keep a close watch on the developments of the 1978 season in western Alaska.

Improvement of techniques, skills and equipment

The high ratio of wounded whales versus captured whales is attributable to a number of factors. Improper use of the shoulder and dart guns by unskilled or careless whaling crews is perhaps the main problem.

The Yankee whale code for taking a Bowhead called for (1) a silent approach; (2) making the harpoon and line fast - that harpoon might be a darting gun iron; (3) killing the whale with thrusts of the lance and/or by a point blank shot in the neck from a shoulder gun.

This was a code strictly adhered to by Yankee whalers and their losses were perhaps one fourth of all the whales struck.

Many Eskimo wholly use the shoulder gun at great expense of bombs and whales.

To return to the Yankee techniques is a very reasonable demand which could be accomplished by a certain amount of schooling or training.

A quota system as well as licensing of whaling captains would attach a certain value to the privilege of whaling, and result in more careful techniques by skilled captains.

The shoulder and darting guns are nearly a century old in design. Modern high-powered lightweight harpoon guns (Webley) are available, as well as various types of explosive bullets which would function more reliably than the black powder bombs. The use of ordinary hunting rifles should be prohibited for shooting whales, since they are ineffective.

In the fall restrictions must be set on the maximum distance from shore whales can be killed. In commercial whaling the legal

delay before processing is 33 hours after death if the whale is only to be processed for oil. If the meat is for human consumption cutting up must be still earlier. Many whales in the fall are unfit for human consumption by the time they are towed back to shore.

Regrettably the experienced captains belonging to the Barrow Whale Captains Association have not been able to enforce the good rules for lack of a constitutional basis.

The October 1977 ban on the taking of Bowheads is unlikely to be lifted if no acceptable harvest guidelines outlining improved techniques are proposed at the next I.W.C. meeting in December 1977.

Conclusion

Subsistence whaling does not have to disappear. The whale stocks have probably not reached the low level as claimed by the conservation movements. However, there is no reliable data available on the exact population of Bowhead, a fact which does dictate a certain caution and restraint in exceeding the second phase (1900-1960) average catch of 10 whales per year. This average had been maintained without any evident depletion of the Bowhead stocks.

Social and cultural changes have not changed the definition of subsistence hunting. However, the eligibility status of many Eskimo hunters to claim the right to subsistence hunt, has changed. Many Eskimo have high annual incomes, are totally urbanized, have lost the true hunting skills and hunt whales merely for sport and the social status of being an "umialik". Tradition does not give the right to subsistence hunt, unlike a true sustenance need does.

Modern technological aids have not decreased the dependence of the true subsistence hunter on the whale. These aids have merely increased the efficiency with which the whale is taken, and thus demand a degree of voluntary restraint and ethical consideration on the part of the hunter. The traditional ethics have been eroded with cultural change, and inexperienced, sometimes ruthless, whalers have provoked by their exhibited lack of respect for life the interference of the powerful conservation groups.

The I.W.C. moratorium is in response to an emotional public opinion, which has no scientific basis whatsoever. The acceptance of the moratorium by the United States government was largely a

result of the stranglehold of conservationist and political considerations at the expense of the subsistence hunter. The timing of the moratorium was fortunate in the respect that it went into effect after the close of the whaling season in Alaska.

The intervening winter will give the Eskimo in the whaling communities time to re-assess the eligibility status of their crews, and produce a strict set of guidelines of ethical conduct, perhaps coupled with a quota system until the exact population status of the Bowhead whale has been determined.

The moratorium is beneficial in the respect that it forces the Eskimo groups to re-assess their, eroded, lack of rules of ethical conduct, and the enforcement of these. Once the re-assessment has taken place with acceptable results, there is no reason why the harvest of Bowhead whales cannot continue at pre-third phase (1960) levels.

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The photographs used at the back are the writer's own.

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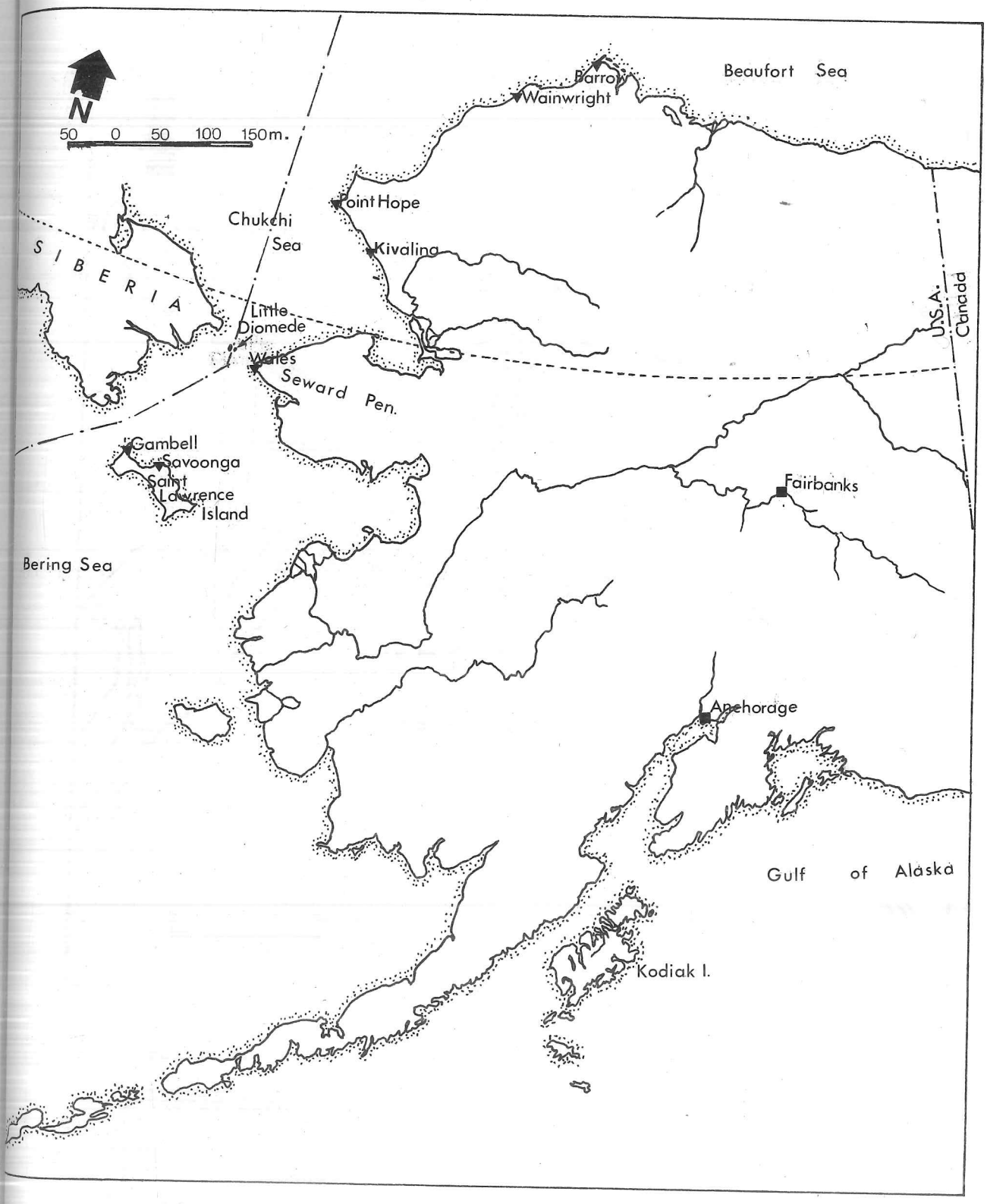
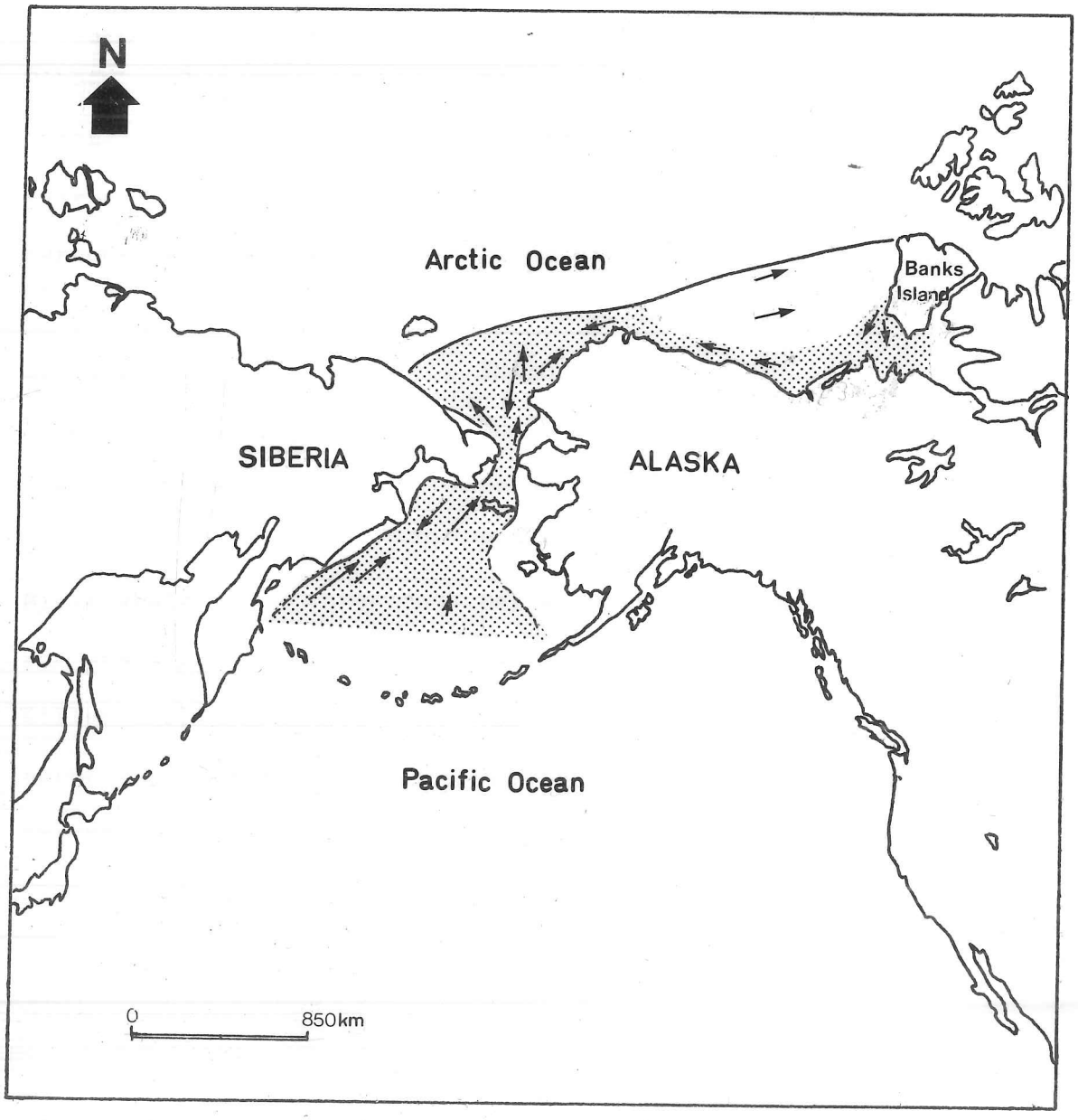
APPENDIX I



Map of Alaska, showing the whaling communities of the western and northwestern coasts.

APPENDIX II



Proposed migration pattern of the Bowhead whale, Balaena mysticetus, in the Bering Sea and the Arctic Ocean. Northerly directed arrows depict the March to June migration and southerly directed arrows depict the September to December migration. Shaded areas are where data are available from historical accounts or from recent sightings. (Marquette 1977).

APPENDIX III

List of marine mammals occurring in the Bering and Chukchi Seas.

Ribbon seal	Histriophoca fasciata
Northern fur seal	Callorhinus ursinus
Walrus	Odobenus rosmarus
Harbour (spotted) seal	Phoca vitulina
Ringed seal	Pusa hispida
Bearded seal	Erignathus barbatus
Polar bear	Thalarctos maritimus
Bowhead whale	Balaena mysticetus
Grey whale	Eschrichtius robustus
Minke whale	Balaenoptera acutorostrata
Fin whale	Balaenoptera physalus
Killer whale	Orcinus orca
Harbour porpoise	Phocoena phocoena
Beluga (white) whale	Delphinapterus leucas
Humpback whale	Megaptera novaeangliae

APPENDIX IV
Basic Equipment used by a Whaling Crew

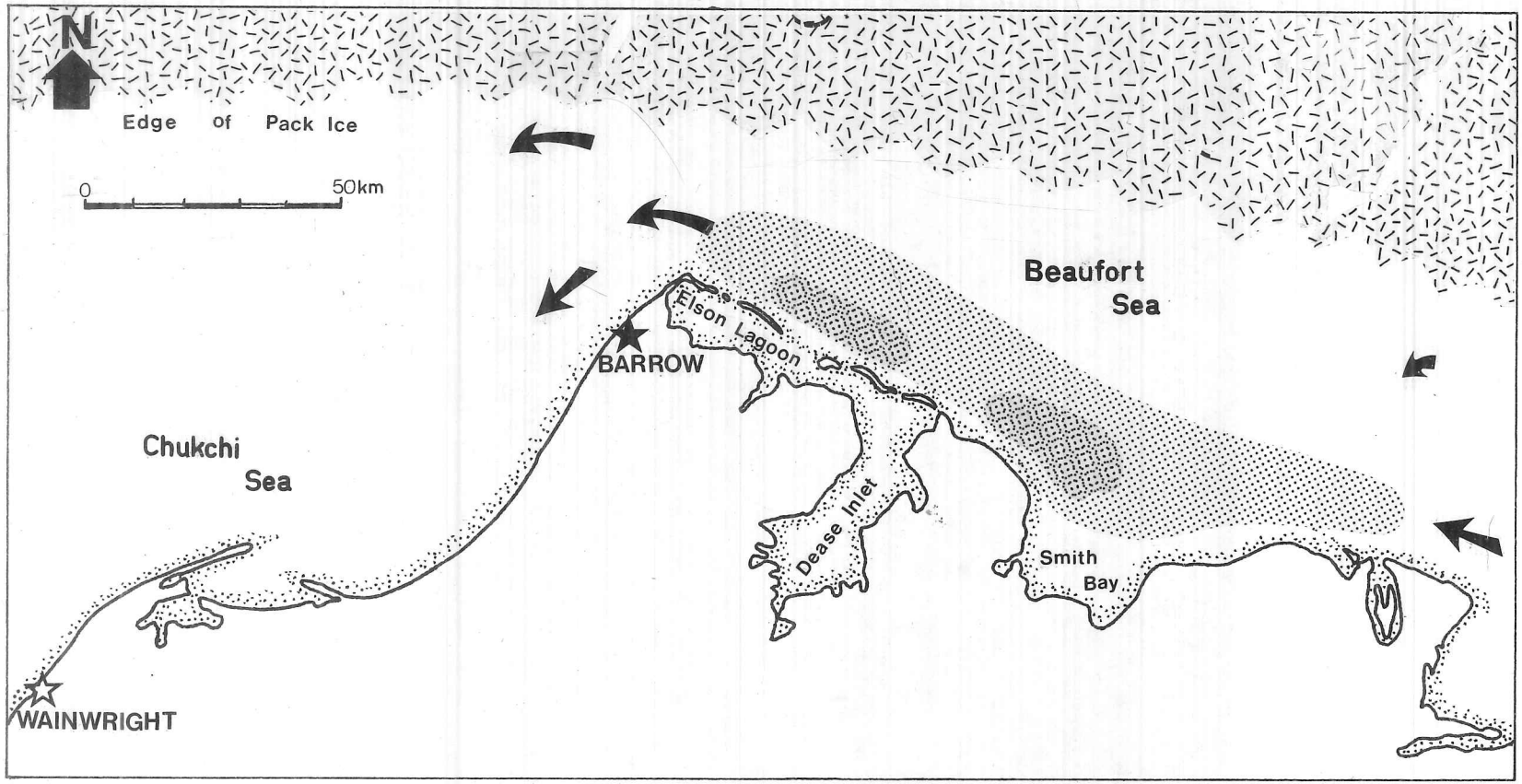
	Item	Replacement Value $	
2	Skin boats	1000	each
2	35hp Evinrude outboard motors	1360	each
20	Paddles	240	
3	Sleds	200	each
3	8 x 10 wall tents	250	each
3	Tarpaulins	80	each
2	Shoulder guns	675	each
2	Darting guns	315	each
10	Gun irons, underbarrel harpoons	31.50	each
10	Darting gun bombs	28.50	each
4	4ft diameter nylon floats	48	each
20	Shoulder gun bombs	41.25	"
2	2ft diameter nylon floats	34	each
1	243 cal.rifle with telescopic sight	340	each
1	30-60 cal.rifle with telescopic sight	370	each
3	Coleman, 3-burner gas stoves	50	each
1	Block and tackle, 1000 ft 1" nylon rope	1000	each
3	Skidoos (snowmobiles)	1800	each
1	pair binoculars	70	
	Total	$7925.25	

APPENDIX V

Bowhead harvest figures for the 1973 to 1976 whaling seasons (spring and fall)

	1973	1974	1975	1976 - 1977
Barrow	17	9	10	23 30
Point Hope	7	4	6	12 2
Saint Lawrence Island	6	2	1	8 2
Wainwright	3	1	0	3 2
Kivalina	0	0	0	0 1
Point Lay	0	0	0	0 1
Wales	0	0	0	0 0
Total	33	16	17	46 38

(Marquette 1977)



Area map of the northwest coast of Alaska depicting the region where Bowhead whales concentrate during the fall. Darkened areas are areas of highest density; hatched areas, where animals are less dense. (Marquette 1977).

1. Whaling camp at the flaw lead, Barrow, May 1976.

2. Unethical conduct, shooting a whale with the shoulder gun only.

3. Apportioning the meat and blubber.

4. Feathered shoulder gun bomb.

5. Shoulder gun bomb recovered from a dead whale.

6. M odern whaling camp, orange nylon floats, outboards, snow machines.

7. Umialik posing with a small Bowhead.

8. Hauling up with block and tackle.

9. Tools: flensing knives, blubber spade, blubber gaff.

10. Umialik with darting gun.

11. Flensing a medium-size Bowhead whale.